TITLE: CONCERNS REGARDING ROCKY FLATS OPERABLE UNIT 1 (881 HILLSIDE) INTERIM REMEDIAL ACTION FRENCH DRAIN COLLECTION SYSTEM

FUNDING PROFILE: (thousand $)

FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997
1,676	4,492	2,215	1,187	1,417	1,419	1,209	0

(Note: Funding is probably inadequate due to the uncertainties identified in this fact sheet.)

ISSUES/FACTS:

- Installation of a French Drain to capture contaminated groundwater does not appear to be the most technically and environmentally sound, or cost effective Interim Remedial Action alternative for the 881 Hillside .

BACKGROUND/DISCUSSION:

- The 881 Hillside has been the site of various spills and disposal operations; 11 individual hazardous substance sites have been identified. It was listed as a "High Priority" site for remediation due to the presence of volatile organic compounds (VOCs), radionuclides and metals in the groundwater, and the potential for contaminants to reach the Woman Creek drainage and possibly contaminate public drinking water supplies.

- Selected groundwater contaminants, with their maximum 881 Hillside concentrations and Applicable and Relevant or Appropriate Regulations shown in parentheses as parts per billion for VOCs and picocuries per liter for radionuclides, are as follows: Trichloroethene (72,000/5); Carbon Tetrachloride (28,000/5); 1,1 Dichloroethene (48,000/7); Benzene (83/5) and Uranium (64/5).

- A number of characterization and feasibility studies were performed between 1987 and 1990, culminating in a final Interim Remedial Action Plan/Decision Document (IRAP) and an Environmental Assessment (EA), both in January of 1990. A French Drain collection system (gravel filled trench with installed piping) and a treatment facility to remove VOCs and metals was the selected remedy. The French Drain itself will be about 2,700 feet long, on average 80 feet in width, and up to 50 feet in depth.

- On January 22, 1991, the Department of Energy (DOE), the Colorado Department of Health, and the U.S. Environmental Protection Agency entered into an Interagency Agreement (IAG) defining the scope and schedule of Environmental Restoration Activities at Rocky Flats (RF). The Interim Remedial Action at the 881 Hillside was assigned top priority. Current IAG milestones call for completion of French Drain construction by March 1992.

- Treatment facility design has remained relatively constant throughout the planning and design process. The only major modification was the addition of radionuclide removal capability at the request of the regulators. Construction of the treatment facility is nearly completed.

- Additional studies were performed after the January 1990; IRAP and EA were issued. Of particular importance is the French Drain Geotechnical Investigation (October, 1990) which identified the need to excavate to depths of as much as 50 feet in some areas, yielding a current estimate of about 250,000 cubic yards of soil to be excavated and disposed.

CONCERNS/SENSITIVITIES:

Recent geological investigations have developed a considerable body of new information. The January 1990 IRAP and EA decision documents, approved by DOE and the regulators, do not mention or do not adequately address the following concerns:

- Worker Health and Safety - Workers will be required to work in trenches at depths of 50 feet or more to install piping, filters, pumps, etc. Associated safety issues were not addressed. Additionally, construction activities will occur on high-angle slopes (40° or more). The ability of the surface to support equipment at steep angles within acceptable safety limits is questionable. Special construction equipment and techniques will probably be required, resulting in increased costs.

- Surface Water Contamination/Sediment Loading - Vegetation will be removed from approximately 275,000 square feet of the Hillside. The potential exists for increased erosion and sediment loading of Woman Creek and associated wetlands.

- Disposal of Contaminated Soils - The volume of soil requiring testing and possible disposal has increased. If the excavation continues as planned, there may be a need to dispose of 4,000 drums or more of hazardous and possibly mixed waste.

- Geological Setting (Bedrock/Colluvium Contact) - At the 881 Hillside, up to 50 feet or more of alluvial or colluvial soils overlie bedrock, which generally consists of fractured sandstones and siltstones. Keying the French Drain into the bedrock may facilitate flow of contaminated water into the bedrock, providing a potential pathway for the subsurface migration of contaminants to downgradient creeks and municipal water supply reservoirs.

  Additionally, a paleo-channel (buried ancient stream bed) is thought to exist in the vicinity of the 881 Hillside. It is not known if this feature is present on the Hillside but, if so, the potential exists for groundwater flow directions to be considerable different from the direction now inferred.

- Slope Stability - Colluvial soil composition and high-angle slopes may result in slope instability, particularly if semi-saturated or saturated conditions occur, perhaps from a summer thunderstorm or other rainfall event. Construction induced slumping could cause the spread of potentially contaminated soils into Woman Creek.

- Integrity of South Interceptor Ditch - The South Interceptor Ditch is a storm diversion along the 881 Hillside above Woman Creek. The realigned French Drain crosses the ditch in several places. Planned construction techniques at these locations may result in the mass movement of potentially contaminated soil into the Woman Creek drainage. These soils could adversely affect aquatic biota and vegetation in and near Woman Creek and could result in violations of the Clean Water Act.

- Ecological Impacts - Sediment loading affects on wetland biota were discussed previously. Destruction of grass and tree cover on the 881 Hillside would eliminate both the habitat of many birds and small animals and food for larger animals. Trees are not common to the grasslands of RF.

- Risk Assessment Impacts - Under the IAG Environmental Restoration cleanup process, DOE will have to prepare an Environmental Evaluation (EE) as part of the assessment and remediation for each Operable Unit and roll those into a final risk assessment. These evaluations will begin at the 881 Hillside and Operable Unit 5 (Woman Creek) concurrently with planned French Drain Construction activities. If significant impact to these ecosystems occurs as a result of construction, the actions would need to be reconsidered.

- French Drain Decommissioning - During operation, the French Drain will accumulate and concentrate contaminants in the lining, fill material, and surrounding uphill colluvium. This material may have to be removed at the end of the French Drain life cycle, resulting in a similar effort to the original excavation and similar impacts.

- French Drain Operational Impacts - Maintenance and operations costs associated with replacement of plumbing and pumps have been addressed. However, costs and environmental impacts of potentially required excavation and reconstruction of sediment-clogged portions of the French Drain have not been considered.

- French Drain Case Studies - French Drains do not work well in locations where the hydraulic conductivity of the "aquifer" (colluvium) is close to that of the "aquiclude" (bedrock). They also do not work well in locations where wide variations in hydraulic conductivity exist within the aquifer or aquiclude. Both appear to be the case at the 881 Hillside. A French Drain collection system is installed at Operable Unit 4 (Solar Evaporation Ponds). While there is not a detailed technical evaluation of the success of this system, there are indications that it has not proven effective in capturing all of the contaminant plume.

OPTIONS:

Sufficient new information exists to readdress the choice of the French Drain as a collection method. However, in order to meet IAG milestone commitments for this action, work must begin on the French Drain or the regulators must be approached with these issues before July 9, 1991.

- Option 1 - Continue With French Drain Construction
  - This will require planning to deal with the concerns noted above, some of which may not have reasonable engineering solutions.
  - Additional funding, which has not been included in the budget, may be required to address new issues.
  - Interim Remedial Action IAG milestones will have to be extended to accommodate actions required to resolve the above concerns. If the regulators do not agree, stipulated penalties may be assessed.
- Option 2 - Revise Interim Remedial Action Plan/Environmental Assessment
  - DOE/RF would immediately inform the regulators that the selection of the French Drain to capture and collect the contaminated groundwater does not appear to be environmentally and technically sound, or cost effective, in light of new geological and ecological information.
  - DOE/RF would immediately begin revision of the IRAP/EA.
  - DOE/RF would request revision and extension of the Interim Remedial Action IAG milestones to accommodate revaluation and selection of the best remediation technology for the 881 Hillside.

RECOMMENDATION:

It is recommended that Option 2 be pursued, to allow the new information to be evaluated and the proper remediation technology to be identified by the integrated Comprehensive Environmental Response, Compensation and Liability Act, Resource Conservation and Recovery Act, and National Environmental Policy Act process. If a remediation technology other than the French Drain is selected, it is likely that even with the additional document preparation costs, the final project cost would be lower.

PREPARER: A. RAMPERTAAP PHONE: 353-8191 DATE: 6/28/91 DIR EM:____